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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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Fig. 1.

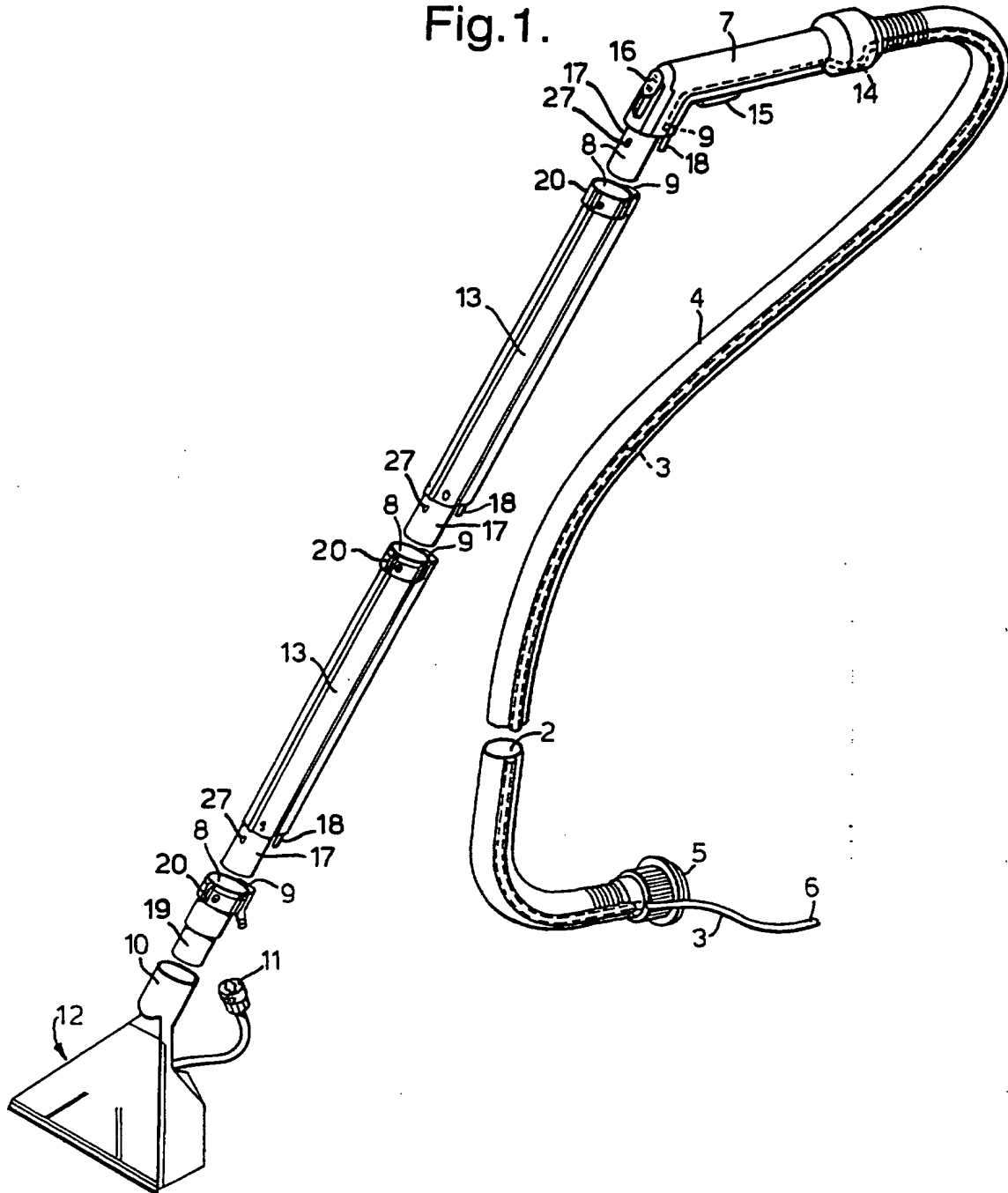


Fig.2.

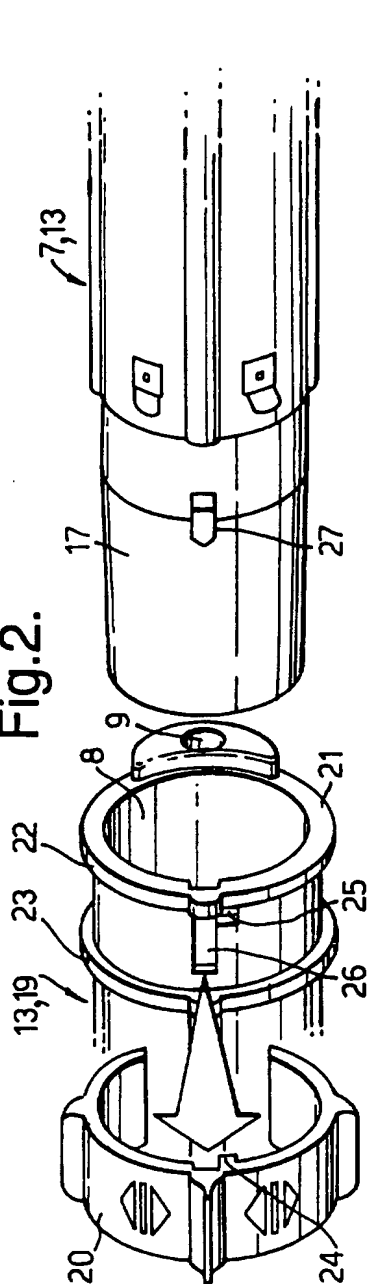
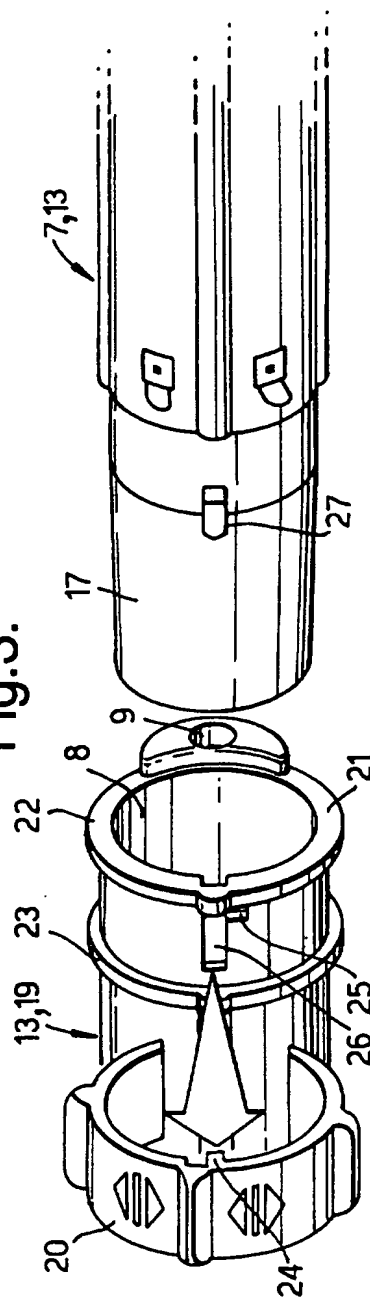


Fig.3.



IMPROVED WASHING-SUCTION CLEANER

The present invention relates to a washing-suction cleaner which can be used for cleaning floor, moquettes, carpets and the like.

As is known, washing-suction cleaners generally comprise a suction device connected to an end of a flexible pipe. The opposite end of the flexible suction pipe is connected to a shaped washing mouthpiece unit by way of a rigid conduit-forming handle structure with possible extensions which are also rigid. The washing-suction cleaners also comprise a tank for liquid detergent which, by way of a pump or the like, is passed under pressure to a flexible delivery pipe which communicates with the washing mouthpiece unit by way of the rigid conduit-forming structure and any extensions.

The extensions comprise one or more rigid conduit-forming bodies which are normally straight and which are capable of being engaged together in mutually aligned relationship by a force fit and in the longitudinal direction between the conduit-forming handle structure and the washing mouthpiece unit. In particular a coupling which involves hydraulic-pneumatic sealing integrity between the various extension bodies and between same and the conduit-forming handle structure is produced with the interposition of respective O-rings or the like which also facilitate mechanical axial locking between the various components. To sum up, the flexible suction and delivery pipes are connected to the washing mouthpiece unit by way of respective conduits of the rigid handle structure and the possible extensions.

In operation however since the delivery pipe had fluid therethrough at relative high pressure and because of the manual movements of the machine, the mechanical locking action between the various rigid conduit-forming components

is generally inadequate to guarantee satisfactory hydraulic sealing integrity with consequential losses of liquid with detergent or even actual disconnection of the components themselves.

5 The aim of the present invention is to provide a simple and reliable washing suction cleaner capable of ensuring a reliable connection involving sealing integrity between the various rigid conduit-forming components.

10 According to the present invention, there is provided a washing-suction cleaner having a washing mouthpiece unit with a first and a second hydraulic coupling which can be respectively connected to a flexible suction pipe and a flexible delivery pipe by way of respective conduits of a plurality of rigid conduit-forming components
15 comprising a rigid handle structure, at least one extension and an element for coupling to the mouthpiece unit, said components being mutually longitudinally interengageable to produce the connection between the respective conduits, wherein said rigid components are provided with mechanical
20 means which are actuatable manually between an angular rest position in which the components are unlocked and can be de-coupled from one another and an operative angular position and which are capable of axially locking together mutually interengaged adjacent rigid components.

25 The invention will be further described by way of non-limitative example with reference to the accompanying drawings, in which:-

 Figure 1 is an exploded diagrammatic view of part of a washing-suction cleaner According to the invention; and

30 Figures 2 and 3 show exploded views of a detail of the machine of Figure 1 in respective operative positions.

 Referring to the drawings the machine primarily comprises a flexible suction pipe 2 (which is preferably spiral-wound or corrugated) and a flexible delivery pipe 3
35 of smaller diameter, which pipes are disposed side-by-side

substantially parallel in the interior of a covering sheath 4 with which they form a compact flexible structure.

5 In per se known manner, one end 5 of the suction pipe is to be considered as being connected to a suction device (not shown) while a corresponding end 6 of the delivery pipe is to be considered as being connected to a pump or the like which extracts and pressurises a liquid detergent disposed in a tank. For the sake of simplicity neither the tank nor the pump are shown in Figure 1.

10 At the opposite end the flexible structure 2,3,4 is coupled to a rigid handle structure 7 which is preferably angled and provided with control members 15 and 16 and forms conduits in per se known manner. In particular the rigid structure 7 is provided with internal longitudinal conduits 15 8 and 9 which respectively communicate at one end with the suction and delivery pipes 2 and 3 and at the opposite end with respective hydraulic couplings 10 and 11 of a washing mouthpiece unit 12. The latter is preferably associated with a rigid conduit-forming coupling element 19.

20 In per se known manner the rigid structure 7 can be coupled releasably directly to the washing mouthpiece unit 12 (with the coupling element 19) or by way of one or more rigid extensions 13 which, in a manner which is substantially similar to the structure 7 and the element 19, 25 are provided with corresponding internal longitudinal conduits 8 and 9. Finally the flexible suction pipe 2 is coupled to the coupling 10 of the mouthpiece unit 12 by way of the conduit 8 of the rigid structure 7 (and possibly the extensions 13) while the flexible delivery pipe 3 is coupled 30 to the coupling 11 of the mouthpiece unit 12 by way of the conduit 9 of the rigid structure 7 (and possibly the extensions 13).

35 In the rigid conduit-forming components 7 and 13 the conduits 8 and 9 project at one end with respective axial portions 17 and 18 of reduced diameter which can be

slightly tapered and/or provided with respective sealing members (not shown). Those axial portions 17,18 are capable of engaging into corresponding ends of an adjacent rigid conduit-forming component which, according to the

5 circumstances involved, may be an extension 13 or the coupling element 19 of the mouthpiece unit 12. It will be appreciated that similar axial portions may also be provided in the coupling element 19 for connection thereof to the washing mouthpiece unit 12. In any case such engagement of

10 the axial portions 17 and 18 provides for mutual coupling as between the conduits 8 and 9 of the adjacent components 7,13 and/or 19.

In accordance with an aspect of the invention, to ensure good hydraulic-pneumatic sealing integrity of the

15 conduits 8 and 9, there are provided simple mechanical means capable of locking the mutually coupled conduit-forming components 7,13,19 in axial position. As is more clearly shown in Figures 2 and 3, those mechanical means comprise a locking member 20 of substantially C-shaped section and

20 mounted at the end 21 of each of the extensions 13 and the coupling element 19, which end is capable of being coupled to the axial portions 17 and 18 of an adjacent conduit-forming component. The member 20 is held in axial position while being angularly displaceable between two travel

25 limits, by two oppositely disposed external ribs 22, 23 on the respective component 13,19. Provided on the internal surface of the member 20 is at least one lug 24 which cooperates slidably with a corresponding transverse slot 25 provided on the conduit-forming component 13,19. The latter

30 further comprises a longitudinal slot 26 which communicates with the transverse slot 25 and which extends along the conduit-forming component from its end 21. The longitudinal slot 26 is of a suitable length and is capable of receiving a corresponding tooth 27 provided integrally at a suitably

35 angularly aligned position on the axial portion 17 of an

adjacent conduit-forming component, which can be the handle structure 7 or an extension 13.

When two conduit-forming components 7,13 (or 13,19) are mutually interengaged as described hereinbefore in order to couple the respective conduits 8 and 9, the tooth 27 slides along the corresponding longitudinal slot 26 and axially "goes beyond" the transverse slot 25 and the lug 24 of the locking member 20 into the operative angular position shown in Figure 3 in which the lug 24 is aligned with the tooth 27. The latter is thus axially locked in the corresponding longitudinal slot 26 whereby accidental slackening or disengagement as between the mutually interengaged conduit-forming components 7 and 13 (or 13 and 19) is prevented. It will be appreciated that the dimensions of the various components will be selected by the man skilled in the art in such a way as to optimise the coupling action between the conduit-forming components.

In any event the structural simplicity, convenience of use and functional reliability of the washing-suction cleaner according to the invention will be apparent, being substantially free from possible unwanted losses of liquid from the conduits 8 and 9.

It will be appreciated that the washing-suction cleaner described may be the subject of numerous modifications which fall within the scope of the invention.

For example the mechanical locking means described hereinbefore may be disposed in a different manner (for example in a reciprocal manner) on the rigid components which can be coupled together, guaranteeing simple and reliable mechanical locking and sound hydraulic sealing integrity between the parts.

CLAIMS

1. A washing-suction cleaner having a washing
mouthpiece unit with a first and a second hydraulic coupling
5 which can be respectively connected to a flexible suction
pipe and a flexible delivery pipe by way of respective
conduits of a plurality of rigid conduit-forming components
comprising a rigid handle structure, at least one extension
and an element for coupling to the mouthpiece unit, said
10 components being mutually longitudinally interengageable to
produce the connection between the respective conduits,
wherein said rigid components are provided with mechanical
means which are actuatable manually between an angular rest
position in which the components are unlocked and can be
15 de-coupled from one another and an operative angular
position and which are capable of axially locking together
mutually interengaged adjacent rigid components.

2. A washing-suction cleaner according to claim 1
20 wherein said mechanical means comprise respective locking
members mounted on said extension and said coupling element
in a position corresponding to respective longitudinal slots
capable of receiving corresponding teeth of an adjacent
rigid interengaged component, each locking member being
25 capable of locking a corresponding tooth axially in position
when it is in said operative angular position, with at least
one lug provided on its internal surface.

3. A washing-suction cleaner according to claim 2
30 wherein said handle structure and said extension are capable
of interengagement with an adjacent rigid component by means
of respective axial portions of reduced diameter and
characterised in that said teeth are integrally provided on
at least one of said axial portions.

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4. A washing-suction cleaner according to claim 2 or 3, wherein when a locking member is in said angular rest position, its lug engages into a transverse slot in the respective rigid component which communicates with a
5 respective longitudinal slot.

5. A washing-suction cleaner according to claim 4, wherein in the operative angular position of the mechanical means the lug obstructs the associated longitudinal slot to
10 prevent withdrawal of the associated tooth.

6. A washing-suction cleaner according to claim 4 or 5, wherein said locking members are held in the axial position on the respective rigid components by means of
15 oppositely disposed ribs of the rigid components themselves, between which said slots are disposed.

7. A washing-suction cleaner constructed and arranged to operate substantially as hereinbefore described with
20 reference to and as illustrated in the accompanying drawings.



Application No: GB 9515717.8
Claims searched: 1-7

Examiner: A C Howard
Date of search: 18 September 1995

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.N): A4F (FSCH, FSLA, FSNS)

Int Cl (Ed.6): A47L 7/00, 9/24, 11/34, 11/40; F16L 37/10, 39/00, 39/02

Other: Online: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	EP 0558460 A1 TAMBORINI whole document	-
A	US 4385413 GOLDSMITH see Fig. 1 and col. 4 lines 55-60	-

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.